

<b>Lesson Plan</b>	<b>Maths</b>	<b>Whole Class</b>	
<b>Class: 1/2D - Stage 1 TOGETHER</b>	<b>Topic: Mass Lesson 1 - Hefting</b>	<b>Week: 4</b>	<b>Date: 18 May 2009</b>
<b>Anticipated Outcomes:</b> MS1.4 Estimates, measures, compares and records the masses of two or more objects using informal units			
<b>What do I want the students to know:</b> Understanding vocabulary for mass, hefting			
<b>Activity/purpose/class structure</b>	<b>Resources</b>	<b>Indicators</b>	<b>IOT elements</b>
<p><i>1. Introduction -</i></p> <p>&gt; <i>What can you tell me about these two objects (a paver and a pebble)? (they are different shapes, different weights)</i></p> <p>&gt; <i>What could we measure about these two things? (how heavy they are)</i></p> <ul style="list-style-type: none"> <li>When we talk about how heavy something is, or how much it weighs, we are talking about MASS. (write up). Mass is a way of measuring how heavy or how light something is.</li> <li>Ask someone to come up and feel the two things (write up one side of the board HEAVY, HARD TO LIFT and on the other side LIGHT, EASY TO LIFT).</li> </ul> <p>&gt; <i>Ask student what it feels like to hold the heavier object in their arms than the lighter (PUSHING DOWN sensation)</i></p> <ul style="list-style-type: none"> <li>What are some heavy/light things in this room? (things have a greater mass if they are hard to push or lift). eg. table, eg. box of books. Light eg. pencils</li> </ul>	<ul style="list-style-type: none"> <li>pebble</li> <li>paver</li> <li>table for demo</li> </ul>		<p>1.1.2 Demonstrate research-based knowledge of the pedagogies of the content/ discipline(s) taught.</p> <p>3.1.2 Plan and implement coherent lessons and lesson sequences that are designed to engage students and address learning outcomes.</p> <p>3.1.4 Demonstrate knowledge of a range of appropriate and engaging resources and materials to support students' learning.</p>

<p><b>2. Estimating</b></p> <ul style="list-style-type: none"> <li>I'd like to tell you a story about when I measure mass. Imagine that we are at the checkout at the supermarket and all my groceries have been scanned and they are ready to go into the shopping bags.</li> <li>&gt; <i>Which items should I put at the bottom of my grocery bag? (the heaviest, so they lighter ones don't get squashed)</i></li> <li>I could ask the lady at the cash register if I could weigh all the items on her weighing scales and record all the numbers and then put them in order of how heavy they are and then pack my bags, but the people behind me might not like that very much.</li> <li>&gt; <i>How can I tell which is heavier? (students may tell me to have a look - which ones are bigger - in which case use the popcorn and then jar and ask a student).</i></li> <li>So I could do it by sight - I could <b>estimate</b> with my eyes which ones are heavy, I might remember what I know about how heavy soft drink is compared to popcorn.</li> <li>I could have a feel of the different groceries. This is called hefting. Maybe I can't tell which one is heavier from my eyes, so I'll use my hands and hold one grocery in each hand. This one feels heavier.</li> <li>Ask students to help me sort out the groceries into heaviest to lighter.</li> <li>DISCUSS HEAVY, HEAVIER, HEAVIEST</li> <li>&gt; <i>What do you notice about these groceries - the popcorn has a bigger packet, but it has a smaller mass than this little jar of jam! So is mass related to how big the object is?</i></li> <li>What if I had a pillow and a brick. Which one is bigger? Which one has the greatest mass? OBJECTS CAN BE THE SAME MASS BUT DIFFERENT SIZES. HOW BIG IT IS isn't necessarily an indicator of how heavy it is. What's an example of an object with the same size but different mass? (eg. a bowling ball and a soccer ball; a school bag full of rocks and a school bag full of popcorn. )</li> </ul>	<ul style="list-style-type: none"> <li>Groceries</li> <li>2 green shopping bags</li> </ul>		
<p><b>2. Hefting</b></p> <ul style="list-style-type: none"> <li>Quickly pack up the groceries into two bags (make sure they have different mass)</li> <li>&gt; <i>I wonder which one has a greater mass? Can we tell by looking with our eyes?</i></li> <li>&gt; <i>How else could we tell?</i></li> <li>HEFTING- I'm going to put a bag in each hand and see which feels heavier. Give 3 students a go.</li> <li><i>Which one do you think has a greater mass?</i> (eg. bag 2 because it's pulling down on my arm more etc). Use phrases like, this bag is lighter than this bag. Which bag is heavier etc</li> </ul>			
<p><b>3. Break up into small groups</b></p> <p><b>ACTIVITY: What do you think?</b></p> <p>&gt; <i>Prediction game. Each student group has four objects.</i></p> <p>Students predict whether their three objects are heavier, lighter, or about the same as another student's four objects. (feather, shoes, hats, cotton balls, leaves).</p> <p>e.g. 5 pencils and 5 sticks, bags or containers for the items</p> <ol style="list-style-type: none"> <li>use comparative language: heavier than, lighter than, heaviest, lightest</li> <li>predict which object would be heavier than, lighter than, about the same and explain reasoning</li> </ol> <p>(Draw the objects in order from lightest to heaviest and explain why you have put them in this order. Year ones have more differentiated objects.</p>	<p>5 containers full of 3 objects each, such as shoe, feather, hat, cotton ball, leaves, empty bottle, block, full bottle. The containers full of</p> <p>10 year ones (2 groups) 15 year twos (3 groups)</p>		

Lesson Plan	Maths	Whole Class	
<b>Class: 1/2D - Stage 1 TOGETHER</b>	<b>Topic: Mass Lesson 2 - Equal Arm Balance</b>	<b>Week: 4</b>	<b>Date: 18 May 2009</b>
<b>Anticipated Outcomes:</b> MS1.4 Estimates, measures, compares and records the masses of two or more objects using informal units			
<b>What do I want the students to know:</b> Move on from hefting to measuring with an equal arm balance.			
Activity/purpose/class structure	Resources	Indicators	IOT elements
<p><b>1. Introduction - experiment with fruit in stockings - Whole Class</b></p> <p>Step 1</p> <ul style="list-style-type: none"> <li>Introduce the activity as measuring mass.</li> <li>&gt; <i>What did we learn about what mass is from yesterday? Is it related to how much space the object takes up?</i></li> <li>• Today I am going to measure the mass of these fruits.</li> <li>&gt; <i>What will I be doing?</i></li> <li>&gt; <i>How could I find the heaviest fruit? The lightest fruit?</i></li> <li>&gt; <i>What does it mean if I ask you to put the fruit in order? (of mass) How could you do that?</i></li> <li>&gt; <i>What are the words you would use? (smallest mass, greatest mass)</i></li> <li>• Ask students to participate in revising the skill of hefting. (DISCUSS LANGUAGE SUCH AS HEAVIER, LIGHTER, HEAVIEST.)</li> </ul> <p>Revise the vocabulary that will be used; write words on chalkboard.</p> <ul style="list-style-type: none"> <li>• Draw the activity on the board. We estimate that the X is heavier than the Y because.....</li> <li>• So we've estimated with our eyes, and done some hefting. Now we are going to measure with..... stockings!</li> <li>&gt; <i>What will you see happening if I drop a heavy fruit into this stocking, and a light fruit into the next stocking? What are the stockings showing us? Why?</i></li> <li>• Put the fruit into the stockings one by one and see which stocking drops the lowest. The lower the stocking drops, the heavier the object. WRITE "The X is lighter than the Y but heavier than the Z. The Y has the greatest mass"</li> <li>• Draw the stockings on the board with the fruit in one going lower- mark it as 'greater mass', the other as 'smaller mass'</li> </ul>	<ul style="list-style-type: none"> <li>An apple, 2 x mandarins and some grapes</li> <li>stockings hung from a bar across demo table</li> </ul>		<p>1.1.2 Demonstrate research-based knowledge of the pedagogies of the content/ discipline(s) taught.</p> <p>3.1.2 Plan and implement coherent lessons and lesson sequences that are designed to engage students and address learning outcomes.</p> <p>3.1.4 Demonstrate knowledge of a range of appropriate and engaging resources and materials to support students' learning.</p>
<p><b>2. Using an equal arm balance - Whole Class</b></p> <ul style="list-style-type: none"> <li>This is an equal arm balance. It is just like our stocking experiment - if I have a heavier object the arm goes down and the lighter object goes up. (draw the one arm going lower = HEAVIER, LIGHTER + flipped in reverse)</li> <li>&gt; <i>It's like a see-saw - what happens when you're on a see-saw - what happens if you are on one end and dad is on the other? (who has the greater mass?)</i></li> <li>• Demonstrate the same result as the fruit and stockings</li> <li>&gt; <i>Now use blocks. If I put two blocks on this side and 1 blocks on the other..... what will happen? (DRAW IT)</i></li> <li>&gt; <i>What if I put four blocks on each side?</i></li> <li>• So if the two objects have an equal mass the arms balance at the same height (draw).</li> <li>&gt; <i>I can also weight more than one object at a time. What if I want to find out how many bottle tops have the same mass as 3 blocks?</i></li> <li>• Put the 3 blocks in and add the appropriate number of teddies until it balances. Then draw up on the board 3 teddies has the same mass as x dinosaurs. DISCUSS IMPORTANCE OF ACCURACY HERE.</li> </ul>	<ul style="list-style-type: none"> <li>equal arm balance</li> <li>Blocks and counters</li> </ul>		

<p><b>2. Equal arm balance - table groups</b></p> <ul style="list-style-type: none"> <li>• <b>Worksheet 1.</b> Which has a greater mass? Predict then measure on the equal arm balance, draw a picture of what you found out, use words from the word bank (heavier, lighter, lightest, heaviest) <ul style="list-style-type: none"> <li>– 5 paddlepop sticks or 4 pencils? x 3 of these.</li> <li>–</li> <li>–</li> </ul> </li> <li>&gt; <i>How close were your two masses?</i></li> <li>&gt; <i>Did you expect to be exactly right?</i></li> <li>&gt; <i>Why?</i></li> <li>&gt; <i>Were some materials better to use than others? Why?</i></li> <li>• <b>Worksheet 2.</b> Each student in the group is given an opaque bag containing different units (labelled 1-5) <ul style="list-style-type: none"> <li>- Students are to heft the bags and place them in order of smallest mass to greatest mass by observation, then hefting, then using the equal arm balance. Students are to state reasoning.</li> <li>- Students are to use the equal arm measure to order the objects and compare their estimations</li> </ul> </li> <li>• (Yr 2) Students are to open the blocks bag and find out how many small blocks are needed to balance 2 big blocks. What else will balance 2 big blocks on your table? What can you say about the two sets of objects if they are equal in height?</li> <li>•</li> <li>• <b>Open-ended questions</b> <ul style="list-style-type: none"> <li>What can you find that is lighter than a pen?</li> <li>Find 3 objects that when put together, have the same mass as your maths book.</li> <li>Can you find 2 objects with the same mass but a different size?</li> <li>What can you find that is bigger than a tennis ball but lighter than it?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Snap lock bags</li> <li>• Varying units to go inside bags</li> <li>• 5 x equal arm balances</li> </ul>		
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*Reference: Teaching measurement: Early Stage 1 and Stage 1, State of NSW 2003, Department of Education and Training Professional Support and Curriculum Directorate*

# Mass



Name \_\_\_\_\_

Yr 1

Scissors or Glue pot or Maths book?

- Before you measure the mass of these objects, draw them in the order you think they go, from lightest to heaviest below.

Label the objects with words from the word cloud:

2 paddlepop sticks or 4 pencils?

Answer these questions:

1) Just by looking, which one do you think has the **greatest** mass?.....

Why? .....

2) By hefting, which one do you think has the **greatest** mass?.....

Why? .....

3) Now measure with the equal arm balance.

Which one has the **greatest** mass?

.....

Draw a picture of the balance and objects:

Now use the equal arm balance to measure the mass of these objects.

- Draw a picture of what you did to measure and your results:

Was your estimation correct? .....

1) Look at the bags and estimate the smallest mass to greatest mass. Now heft the bags. Draw and label the bags below with your estimation:



Bags \_\_\_\_\_ and \_\_\_\_\_ have a similar mass.

3) Were your estimations correct? Why or Why not?

4) Now open the bags and find out how many pencils will balance 4 bottle tops.

Draw a picture with words that describes how you found the answer

5) What else will balance a big block, that is on your table?

6) What can you find in the classroom that has a smaller mass than a pencil?

7) Find 3 objects that when combined, have the same mass as your maths book.

8) Can you find 2 objects with the same mass but a different size?

9) What is bigger than a tennis ball but lighter than it?

<b>Lesson Plan</b>	<b>Maths</b>	<b>Whole Class</b>	
<b>Class: 1/2D - Stage 1 TOGETHER</b>	<b>Topic: Mass Lesson 3 - Revision &amp; Assessment</b>	<b>Week: 4</b>	<b>Date: 22 May 2009</b>
<b>Anticipated Outcomes:</b> MS1.4 Estimates, measures, compares and records the masses of two or more objects using informal units			
<b>What do I want the students to know:</b> Understanding vocabulary for mass, hefting			
<b>Activity/purpose/class structure</b>	<b>Resources</b>	<b>Indicators</b>	<b>IOT elements</b>
<b>1. Revision</b> <ul style="list-style-type: none"> <li>What were we measuring earlier this week?</li> <li>How did we do it?</li> <li>How can I tell if something has a greater mass? (by looking, by hefting, by using the equal arm balance. Which one would be estimating? Which one would be measuring?</li> <li>How could I tell if something if one toy has a smaller mass than another toy? (DRAW IT)</li> <li>What words do we use to measure and compare mass? (heavier, lighter, heaviest, lightest) WRITE THEM UP</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>		
<b>2. Assessment in table groups - Cheryl to do Year 2 observations, Kerry to do Year 1</b> <ul style="list-style-type: none"> <li>Provide Year 1 students with 3 objects and ask them to order the 3 objects from smallest to greatest mass. Why do students think this? Support their reasons with pictures and words. (the objects are quite different in mass) <ul style="list-style-type: none"> <li>Ask students to compare and order the objects from smallest to greatest using an equal arm balance with accuracy. Do the results reflect their estimations. NOTE - extension - offer 4 objects to Year 1s if they seem capable.</li> </ul> </li> <li></li> <li>Provide Year 2 students with 4 objects and ask them to order the 3 objects from smallest to greatest mass . Why do students think this? Support their reasons with pictures and words.. (the objects are quite similar in mass) <ul style="list-style-type: none"> <li>Ask students to compare and order the objects from smallest to greatest using an equal arm balance with accuracy. Do the results reflect their estimations? NOTE - extension - offer 5 objects to Year 2s if they seem capable.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>5 x equal arm balances</li> </ul>		

*Reference: Teaching measurement: Early Stage 1 and Stage 1, State of NSW 2003, Department of Education and Training Professional Support and Curriculum Directorate*

